

08/800583



02/18/97



EXPRESS MAIL NO. EM175422875US

PATENT

Docket No. ZMYJ-01-116

PATENT APPLICATION
 Assistant Commissioner For
 Patents
 Washington, D.C. 20231

NEW APPLICATION TRANSMITTAL

Transmitted herewith for filing is the patent application of

Inventor(s): Walter Josef Martin and Johannes Martin
 For (title): FIRE GRATE, IN PARTICULAR FOR WASTE
 INCINERATORS

3 Sheet(s) of drawing(s)
☒ formal
☐ informal

☒ An assignment of the invention to:
Matin GmbH für Umwelt- und Energietechnik

☒ Certified copy(ies) of application(s)

Germany 196 06 107.5 02/19/96
 (country) (appln. no.) (filed)

(country) (appln. no.) (filed)

☒ Declaration or Oath

Fee Calculation (37 CFR 1.16)

CLAIMS AS FILED

Number filed	Number Extra	Rate	Basic Fee
			\$ 770.00
Total			
Claims	13 - 20 = 0	x \$ 22	\$0
Independent			
Claims (37 CFR 1.16(b))	1 - 3 = 0	x \$ 78	\$0

Multiple dependent claims(s),
if any (37 CFR 1.16(d))
\$

Filing Fee Calculation \$770.00

[X] Verified Statement(s) that this is a filing by
a small entity under 37 CFR 1.9 and 1.27
is(are) attached.

Filing Fee Calculation (50% of above) \$385.00

Fee Payment Being Made At This Time

[] Not Enclosed

[] No filing fee is to be paid at this time.
(This and the surcharge required by 37 CFR
1.16(e) can be paid subsequently.)

[X] Enclosed

[X] basic filing fee	<u>\$ 385.00</u>
[X] fees for claims	<u>\$ 0</u>
[X] recording assignment (\$40.00 37 CFR 1.21(h))	<u>\$ 40.00</u>

Total fees enclosed \$385.00/\$40.00

Method of Payment of Fees

[X] Checks in the amount of \$385.00 & \$ 40.00

[] Charge Account No. 23-3000 in the amount of \$_____.
A duplicate of this transmittal is attached.

Authorization to Charge Additional Fees

[X] The Commissioner is hereby authorized to charge the
following additional fees by this paper and during the
entire pendency of this application to Account No.
23-3000.

[X] 37 CFR 1.16(a), (f) or (g) (filing fees)

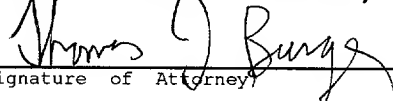
[X] 37 CFR 1.16(b), (c) or (d) (presentation of extra
claims)

- ☒ 37 CFR 1.16(e) (surcharge for filing the basic fee and/or declaration on a date later than the filing date of the application)
- ☐ 37 CFR 1.17 (application processing fees)
- ☐ 37 CFR 1.18 (issue fee at or before mailing of Notice of Allowance, pursuant to 37 CFR 1.311(b))

Instructions As to Overpayment

- ☒ credit Account No. 23-3000
- ☐ refund

WOOD, HERRON & EVANS, L.L.P.


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\$

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[X] Enclosed

[X] basic filing fee	<u>\$ 385.00</u>
[X] fees for claims	<u>\$ 0</u>
[X] recording assignment (\$40.00 37 CFR 1.21(h))	<u>\$ 40.00</u>

Total fees enclosed \$385.00/\$40.00

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[] Charge Account No. 23-3000 in the amount of \$_____.
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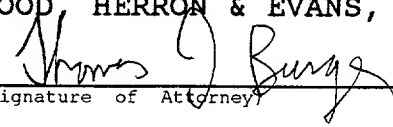
[X] 37 CFR 1.16(b), (c) or (d) (presentation of extra
claims)

- [X] 37 CFR 1.16(e) (surcharge for filing the basic fee and/or declaration on a date later than the filing date of the application)
- [] 37 CFR 1.17 (application processing fees)
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WOOD, HERRON & EVANS, L.L.P.


(Signature of Attorney)

Thomas J. Burger

(Type or print name of attorney)

Reg. No. 32,662

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Cincinnati, OH 45202

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PATENT



Serial No.:

Filed:

Post Unit:

Examiner:

Applicant: Walter Josef Martin and Johannes Martin

Title: **FIRE GRATE, IN PARTICULAR FOR WASTE INCINERATORS**

Cincinnati, Ohio 45202

February 17, 1997

BOX: PATENT APPLICATION

Assistant Commissioner for Patents

Washington, D.C. 20231

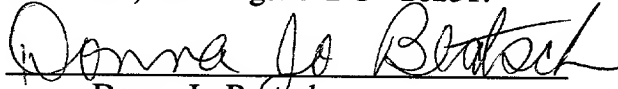
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DATE OF DEPOSIT: February 17, 1997

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Donna Jo Beatch

Enclosures:

- Verified English language translation of Application (23 total sheets) including Specification (13 sheets), 13 claims (5 sheets), Abstract (1 sheet), 4 Figures (3 sheets), Certification (1 sheet)
- Declaration, signed, attached to application
- Check No. 1664 for \$385.00 (filing fee)
- Assignment Of Invention And Patents Thereon
- PTO Form 1595 (Assignment Cover Sheet)
- Check No. 1666 for \$40.00 (assignment recordation)
- Verified Statement Claiming Small Entity Status
- Certified Copy of German Priority Application No. 196 06 107.5
- Information Disclosure Statement, including PTO Form 1449 citing 1 reference, and a copy of the reference
- Preliminary Amendment
- Transmittal Form (in duplicate) (13 total claims, 1 independent, 12 dependent, 0 multiple dependent)
- Return Postcard

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**FIRE GRATE, IN PARTICULAR
FOR WASTE INCINERATORS**

5 The invention relates to a fire grate, in particular for waste incinerators, with partly overlapping rows of grate bars, wherein along the longitudinal axis the grate bar rows are alternately fixed and movable and wherein the grate bar rows are bordered, or bounded, by grate side plates. The grate side plates are movable transverse to their longitudinal axes and can be pressed towards the grate bar rows by tensioning devices, which are held in the oven wall and which are shaped as piston-cylinder-units.

10 With one known combustion grate of this kind (DE-41 05 331 C1), the grate side plates are guided at the upper and lower edges by grate bar shields, particularly shields which appear u-shaped, and the grate bar shields are fastened to grate bar supports. Hydraulic cylinders serve as tensioning devices and are provided at both ends of the grate side plates, so that each hydraulic unit pushes both ends of adjacent grate

side plates. Along their longitudinal axis the stationary grate bars secure directly to the grate side plates. For each of the longitudinally movable grate bars a glide piece is provided, guided in the grate side plates onto which an additional hydraulic-cylinder-unit acts, which extends freely through the grate side plate with its ram. Relatively high expense is incurred, in order to equalize the different conditions that may arise between the movable and the fixed grate bar rows. One further disadvantage of this design relates to the narrow guiding of the grate side plates in the u-shape guidings, in particular under the influence of dust, which is unavoidable in a combustion chamber. In this environment, dust accumulation may cause tilting and jamming, thereby adversely affecting the use of the grate.

The objective of the invention is to design a grate characterized according to claim 1, achieving a relatively trouble-free use of the grate and the tensioning devices including the grate side plates, with relatively low constructional expense.

The invention reaches this objective by starting with a grate of the above-mentioned kind, by rigidly securing a piston of the tensioning device onto each grate side plate to support and guide the grate guide plate only with the piston, and the tensioning device includes a cylinder open towards the combustion chamber with a hollow-piston guided therein. The

piston is charged by a spring element supported by the cylinder's bottom, and the piston is rigidly secured to the grate side plate by a piston bottom which is sealingly guided by a "piston-shirt" located within the cylinder.

This design improves over the prior art, or current state of the art, because no further guidings for the grate side plates are necessary, since the guiding and supporting tasks are provided by the tensioning device itself, to which the grate side plates are in each case rigidly secured. Prior problems related to tilting and jamming of the grates are thus avoided. The constructional expense is also minimized, because no additional guidings for the grate side plates are necessary.

In order to have the piston of the tensioning device perform the guiding task in a very reliable way, another aspect of the invention contemplates providing the "piston-shirt" with a length longer than the depth of the cylinder. With this feature, during all stroke movements which the tensioning device has to carry out during operation of the grate, there is at all times a sufficient guiding length of the piston inside the cylinder.

According to a further aspect of the invention, which is advantageous for proper guiding of the pistons and thereby for proper guiding, i.e., no-sticking, of the grate side plate, the diameter of the

pistons (the pistons are preferably circular in cross section), is larger than one half of the height of the grate side plate. Due to the large dimension of the cylinders and the pistons of the tensioning device, which is at the same time the guiding device for the grate side plate, a proper guiding of the grate side plate is guaranteed at a low constructional expense. This proper guiding is assured even during technical faults in the use of the grate, which may result from objects entering in between neighboring grate bars.

According to still another advantageous aspect of the invention, neighboring or adjacent pistons are connected to each other by guiding bars, which flexibly connect the free ends of neighboring pistons. These guiding bars not only help to avoid rolling or twisting of the pistons, they also serve to influence neighboring pistons of neighboring tensioning devices in a way such that one piston takes along the neighboring piston up to a certain extent. Thereby a connection is made between the separate tensioning devices just like a limb chain, which has effects on each of the neighboring pistons, so that like a wavy line the grate side plates can adapt to the different stretch conditions of the grate bar rows, which lay one on top of the other like roof tiles. By doing so, there is no need for additional tensioning devices as required by conventional state of the art waste incinerator tensioning devices, which reach through the

grate side plate to act directly upon the movable grate bar rows and which are generally very expensive. Thus, this invention avoids the technical expense of these known grate designs.

5 According to yet another aspect of the invention, each of the joint connections between the pistons and the guiding bar has a joint bolt which is oriented at a right angle to the longitudinal axis or the piston, and which extends through the guiding bar
10 and is retained by spaced support tongues which are rigidly secured to the piston and which hold the guiding bar therebetween. Thereby a robust and simple constructive connection between neighboring pistons is made, which allows for reciprocal or mutual
15 compensation of different stretch states of grate bar rows.

 Due to the fact that there are no additional guiding devices needed (particularly guiding devices of the prior art, which are constructionally lavish and
20 require a relatively large amount of space), the invention contemplates a further design advantage which relates to the fact that the cylinders are fastened concisely to the bottom of an oven wall recess, setback, having a depth measurement such that the grate
25 side plates secured to the open ends of the cylinder are aligned with the oven wall at operating temperature of the grate bars. Additional space to provide additional guiding devices for the grate side plates is

not necessary, so that there is no need for extra designing expense of the oven wall due to the reduced space requirements. Such additional amounts of space were required, however, by conventional guiding devices.

In order to increase the heat resistance of the grate side plates, which obviously can be created as simple plates, the invention contemplates designing the grate side plates with double walls and a carrying or support plate connected to the piston, as well as a grate border plate depending therefrom made of high temperature resisting material and having backside support ribs (on the side of the carrying plate), extending transverse to the longitudinal axis of the grate border plate. With this design the grate side plate can have a smaller size than usual (compared to the prior art conventional side plates), because it is covered by the grate border plate which has larger height and length dimensions.

Preferably, the grate border plate comprises several smaller plate parts, or portions, arranged in longitudinal alignment with some amount of spacing therebetween, along the longitudinal direction of the carrying plate, the total length of the plate portions corresponding to the length of the carrying plate.

Still another advantageous aspect of the invention relates to the fact that each of the grate side plates has a flange along its upper edge extending

toward the oven wall. The flange is covered by a covering ledge secured to the oven wall, preferably with some clearance space therebetween, i.e., a relatively loose tolerance. Thereby a certain protection is achieved against ingress of dust and other parts, which could otherwise enter behind the grate side plates.

To improve this barrier, or ingress prevention, according to a further advantageous aspect of the invention an elastically yielding seal is located between the free edge of the flange of the grate side plate, particularly the free edge of the grate border plate, and the oven wall, preferably with the seal fastened to the oven wall. Such a seal consists of mineral components, in a known way, which are accordingly heat resistant and sufficiently elastic to accommodate the movement of the grate side plate, particularly the grate border plate, and to provide an effective seal.

A further improvement of the seal relates to the use of a bridge extending longitudinally along the backside of the grate side plate, particularly the carrying plate, which extends sealingly into a horizontal groove formed in the seal.

In order to protect the seal from excessive stress due to dust, a further design of the invention contemplates including a hollow space within the covering ledge, and opening toward the flange. This

space may be formed by the integral shape of the covering ledge, whereby a kind of a labyrinth sealing effect is created between the flange of the grate side plate, particularly the grate border plate, and the covering ledge, thereby providing a void space for any entering air and airborne dust, so that the dust penetration between the upper edge of the grate side plate, particularly the grate border plate, and the covering ledge is mostly prevented. This reduces dust exposure for the seal thereby enabling it to perform its sealing function for a longer period of time.

In order to adjust the tensioning device to the respective circumstances, or conditions, according to still another aspect of the invention the spring element may be adjustable in its tension.

The invention will be more readily understood in view of the following drawings and detailed description, which are exemplary in nature. The drawings show:

Fig. 1: A vertical section through a tensioning device with carrying plate and grate border plate;

Fig. 2: A view in the direction of the section lines II-II in Fig. 1;

Fig. 3: A sectional view according the lines III-III in Fig. 2; and

Fig. 4: A vertical section, similar to Fig. 1, of another embodiment of the invention.

Reference numeral [1] refers to an oven wall having a setback, or recess [2] at the height of the grate, into which several tensioning devices are arranged, the tensioning device referred to generally by reference numeral [3]. Each tensioning device [3] includes an open cylinder [4] which opens towards a combustion chamber, and which is fastened securely with one open end onto a bottom or outermost portion [5] of the recess [2], for example by a welding seal [6].

Within the cylinder [4] a hollow piston [7] with its piston skirt [8], is guided and sealed by a seal [9] to prevent dust from entering the interior of the cylinder [4]. The piston skirt [8] is designed longer than the depth of the cylinder [4], so that it is guided sufficiently at all times during all stroke movements. At the bottom [10] of the piston [7] there is a carrying, or support, plate [12] solidly fastened by screws [11], onto which a group of grate border plates, or plate portions [13] (Fig. 3) depend to provide heat protection. The grate border plates have bowed upper ends [14] and ribs [15] extending therefrom with depending grooves [16]. The grate border plate [13] also has a flange [17] on its upper edge, extending towards the oven wall, and a free end [18] thereof engages an elastic seal [19], which is held to the bottom [5] of the recess [2] of the oven wall [1], by a support [20]. A covering ledge [21] is also secured to the oven wall above the flange [17] of the grate border

plate [13]. The ledge [21] is formed so as to have an inverted V-shaped bend [22] and a hollow space [23] therebelow created by the shape [22]. The space [23] defined by ledge [21] is mostly covered by the flange [17], so that a void or relaxation space is created therebetween, just like a labyrinth seal. In the shown example the grate side plate comprises the carrying plate [12] and the grate border plate [13]. If both components are designed as a single combined structure, the combined grate side plate has the same outer appearance as the grate border plate [13].

The grate border plates [13], which are hung on the carrying plate [12], one alongside the other with small gaps [24] therebetween, have a total length which corresponds to the length of the carrying plate [12], so that there is no covering between adjacently located carrying plates [12] at the gap [25]. Thereby each of the carrying plates [12] and the grate border plates [13] attached thereto can move together transverse to the longitudinal direction of the grate, due to extension of the grate caused by the action of the tensioning device [3].

In order to operate the tensioning device [3] to cause this movement, a compression spring [26] is provided inside the hollow piston [7], with one end thereof secured to a bottom [10] of the piston [7] and the other end secured to a backplate [27] which is shaped to conform to the inner diameter of the hollow

piston [7]. The backplate [27] is seated at the end of an adjusting screw [28], which is screwed into a nut [30] secured to the bottom [29] of the cylinder [4] and which is secured by a counternut [31]. On its outer
5 end, i.e., outside of the cylinder [4] and outside the chamber, the adjusting screw [28] has a head-shaped handle [32] with a throughbore [33], into which an accordingly thick bar can be inserted in order to twist the adjusting screw [28] and to adjust the tension of
10 the pressure spring [26].

The piston [7] extends out of the cylinder [4] a distance such that the grate border plates [13] and essentially aligned, or lined up with, the oven wall [1]. Within the free space, which is formed by
15 the recess [2], the neighboring pistons [7] are flexibly connected by guiding bars [34]. Spaced support tongues [35] are fastened, for example by welding, onto opposite sides of the piston shirt [8] of each piston [7]. The spaced support tongues [35] also
20 hold therebetween the guiding bar [34], and a joint connection is made via a joint bolt [36] which extends through aligned holes in the spaced support tongues [35] and the guiding bar [34]. Due to the fact that the pistons [7] of neighboring tensioning devices [3]
25 are flexibly connected by the guiding bars [34], a twisting of the pistons [7] in their respective cylinders [4] and a twisting of the carrying plates [12] is avoided. Also, the mutual influence of

tensioning devices [3] is achieved by these guiding bars [34], so that different expansions of grate bar rows following, or adjacent, one another can be compensated. These different expansion conditions can
5 be caused on the one hand by the different heat burdens of the grate bars, or by pieces of slag, which sometimes enter in between the grate bars.

Each carrying plate [12] is attached to one tensioning device [3], by which the carrying plate is
10 supported and guided. In order to achieve proper guiding, the piston [7] and the respective cylinder [4] have a diameter as large as possible, with the diameter of the piston being almost as great as the height of the carrying plate [12]. The length of the piston
15 shirt [8] also promotes a stable guiding of the piston [7] and thereby of the carrying plate [12]. Each carrying plate [12] can either be attached to a single grate bar row or the carrying plates can also have a greater length, so that they spread in part over the
20 following grate bar row or even over several grate bar rows. In order to enable the carrying plates to resist the recurring forces, bridges [37] are secured to the backsides thereof, for example by welding. To increase the stability of the grate border plate [13], ribs [38]
25 (Fig. 3) are provided on the backsides, which run transverse to the longitudinal direction of the carrying plate [12]. Due to the spacing between these ribs [38], in the vertical direction hollow spaces [39]

are created, into which fresh air can enter from the lower area of the gap that is created by the recess [2], in order to cool the grate border plates and/or the carrying plate. Due to the seal [19], this
5 upwardly flowing cooling air coming out of the lower air box is not able to flow around the grate laterally. For this reason, the lower air box causes practically no dust wear or strain, and the seal [9] is sufficient enough to keep dust from entering into the cylinder
10 [4].

Fig. 4 shows a variation of the seal between the grate border plates and the oven wall. According to this variation, the seal [19'] has a greater vertical dimension and also has a horizontal groove
15 [40], into which a lengthened bridge [37'] extends to achieve additional sealing. Except for this difference, the design shown in Fig. 4 is identical with the design referring to Figs. 1, 2, 3.

Patent Claims:

1. Fire grate, in particular for use in waste incinerators with partly overlapping rows of grate bars, wherein along the longitudinal axis the grate bar
5 rows are arranged alternately fixed and movable and wherein the grate bar rows are bordered by grate side plates, the grate side plates being movable transverse to their longitudinal axes and pressable towards the grate bar rows by tensioning devices which are held in
10 the oven wall and which are shaped as piston cylinder units, the invention further characterized in that each grate side plate (12, 13) is secured to a piston (7) of the tensioning device (3) and supported and guided only by the piston (7), the tensioning device (3) having a
15 cylinder (4) open towards the combustion chamber and a hollow piston (7) guided therein, which is charged by a spring element (26), supported by the bottom (29) of the cylinder (4), the piston (7) being securely fastened to the grate side plate (12, 13) with a piston
20 bottom (10) and being sealingly guided by a "piston-shirt" (8) located inside the cylinder (4).

2. The fire grate of claim 1, and further characterized in that the "piston-shirt" (8) has a length longer than the depth of the cylinder.

3. The fire grate of claim 1 or 2, and further characterized in that each of the pistons has a circular shape and a diameter which is greater than one half of the height of the grate side plate.

4. The fire grate of claims 1, 2 or 3, and further characterized in that neighboring pistons (7) are flexibly connected with each other along their free ends by guiding bars (34).

5. The fire grate of claim 4, and further characterized in that a joint connection resides between the piston (7) and the guiding bar (34), including a joint bolt (36) oriented at a right angle to the longitudinal axis of the piston (7) and extending through the guiding bar (34), the joint bolt held by support tongues (35) which are rigidly held on the piston (7) and which hold the guiding bar (34) therebetween.

6. The fire grate of one of claims 1-5, and further characterized in that the cylinders (4) are mounted to the bottom (5) of an oven recess, or setback (2), so as to be recessed at a depth such that the
5 grate side plates (12, 13) at the operating temperature of the grate bars are aligned with the oven wall (1).

7. The fire grate of one of claims 1-6, and further characterized in that each of the grate side plates has a double wall, including a carrying plate (12) connected to the piston (7) and a grate border
5 plate (13) depending therefrom, the grate border plate (13) having ribs (38) extending toward the carrying plate (12) and oriented transverse to the longitudinal axis.

8. The fire grate of claim 7, and further characterized in that the grate border plate (13) has at least two plate parts arranged one next to another along the longitudinal direction of the carrying plate
5 (12), the total length of the plate parts corresponding to the length of the carrying plate (12).

9. The fire grate according to one of the claims 1-8, and further characterized in that each of the grate side plates (12, 13), particularly the corresponding grate border plate (13), has a flange (17) along an upper edge thereof, the flange (17) extending toward the oven wall (1), and a covering ledge (21) fastened onto the oven wall above the flange (17).

10. The fire grate of claim 9, and further characterized in that an elastically yielding, seal (19) is fastened to the oven wall (1) between a free edge (18) of the flange (17) of the grate side plate (12, 13), particularly the grate border plate (13), and the oven wall (1).

11. The fire grate of claim 10, and further characterized in that a bridge (37') is located along the backside of the grate side plate (12, 13), particularly the carrying plate (12), the bridge (37') extending along the longitudinal axis and the bridge (37') extending sealingly into a groove (40) of the sealing volume (19').

12. The fire grate according to one of claims 9-
11, and further characterized in that the covering
ledge (21) includes a hollow space (23) which opens
toward the flange (17), the hollow space (23) defined
5 by an angle formed in the covering ledge (21).

13. The fire grate of one of claims 1-12, and
further characterized in that the spring element (26)
is adjustable in its tension.

Abstract of the Invention

A fire grate has tensioning devices (3) inserted in recesses (2) of an oven wall (1), with each device acting upon one grate side plate. The

5 tensioning device (3) includes a cylinder (4) inserted into the oven wall, a hollow piston (7) guided therein and a spring (26), which can be adjusted in its tension. The grate side plate has a carrying plate (12) directly fastened to the piston bottom (10) with a

10 grate border plate (13) suspended, or hanging, on the carrying plate (12). The piston (7) has diameter and length dimensions such that it can support and guide the grate side plate without further guiding devices. Neighboring pistons (7) are connected flexibly to each

15 other by guiding bars (36), so that the pistons (7) can influence each other reciprocally. An upper edge of the grate side plate, particularly the grate border plate (13), has a flange (17) extending toward the oven wall. The flange (17) sealingly engages an elastical

20 seal (19), fastened onto the oven wall. An additional covering ledge (21) covers the flange (17) and includes a shaped part or angle (22) which bounds a hollow space (23) between these two parts, just like a labyrinth seal.

CERTIFICATE OF TRANSLATION



I, Florian Boegel, hereby certify that to the best of my knowledge the attached patent application entitled "Fire Grate, In Particular For Waste Incinerators," is a true and accurate English language translation of German Patent Application No. 196 06107.5, entitled "Feurungsrost, insbesondere für Müllver-brennungsonlagen."

Florian Boegel

Date: 2/13/97

STATE OF Ohio)
) ss.
COUNTY OF Hamilton)

On this 13th day of February, 1997, before me personally appeared Florian Boegel, to me known and known to me to be the above named individual who duly acknowledged the signing of the foregoing instrument to be a voluntary act and deed and who executed the same for the uses and purposes therein specified.

Notary Public

SEAL

KEITH R. HAUPT, Attorney at Law
Notary Public, State of Ohio
My Commission Has No Expiration Date
Section 1/7/99

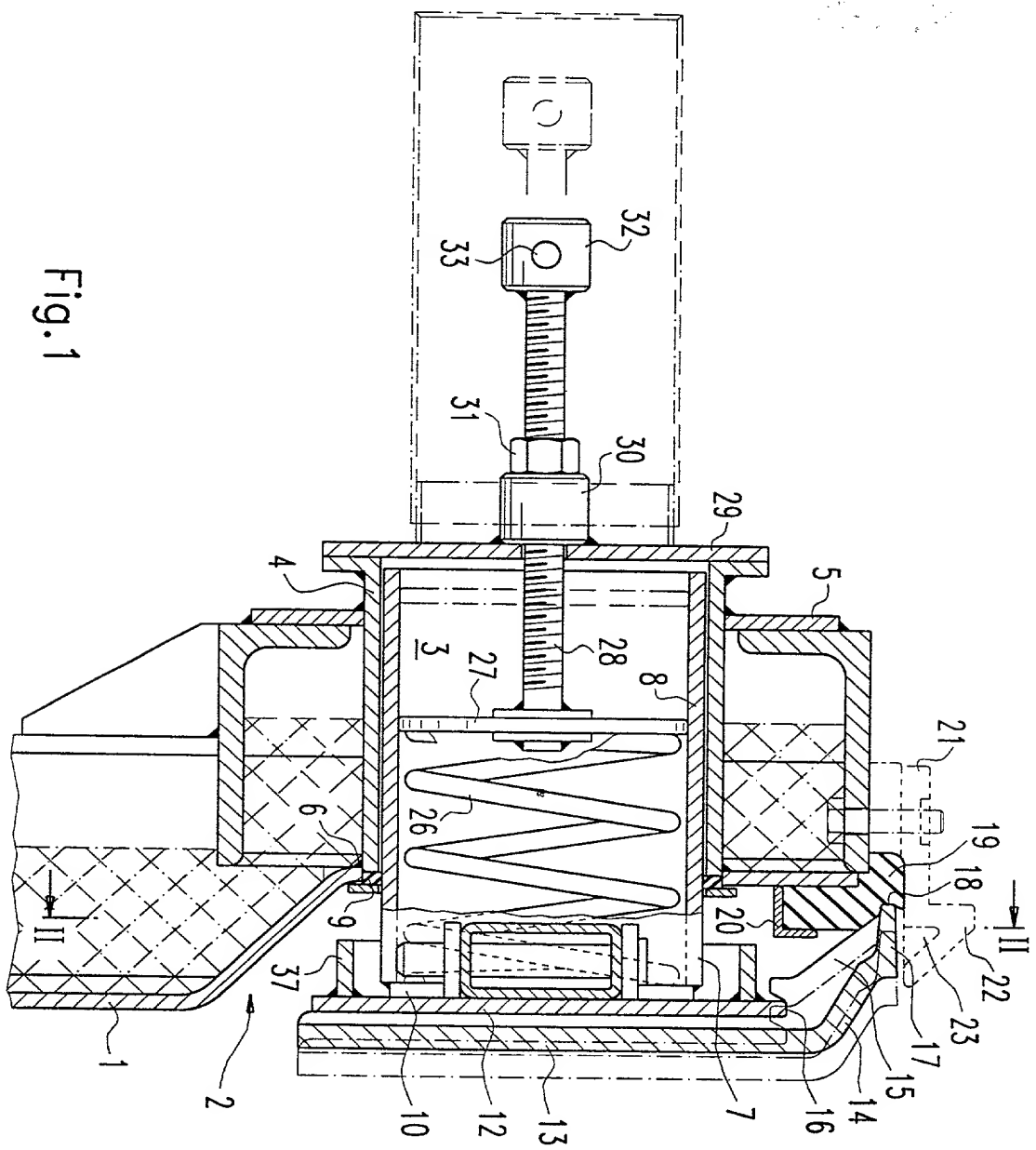


Fig. 1

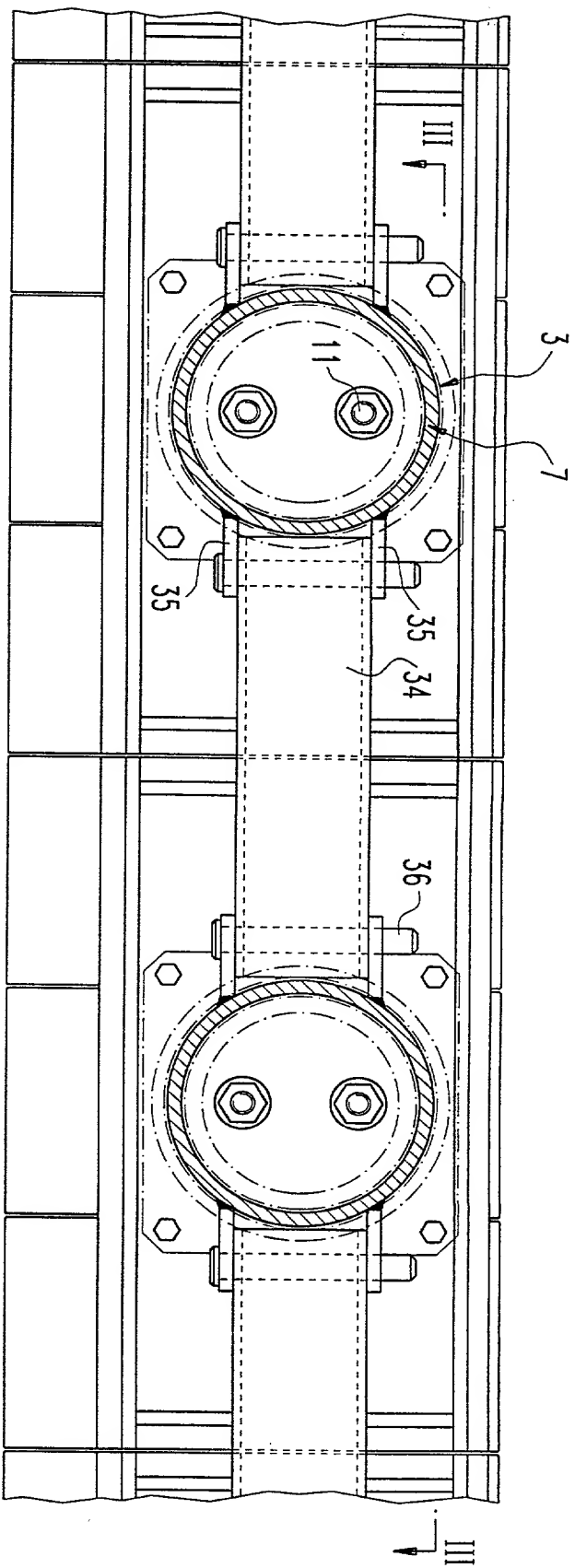


Fig. 2

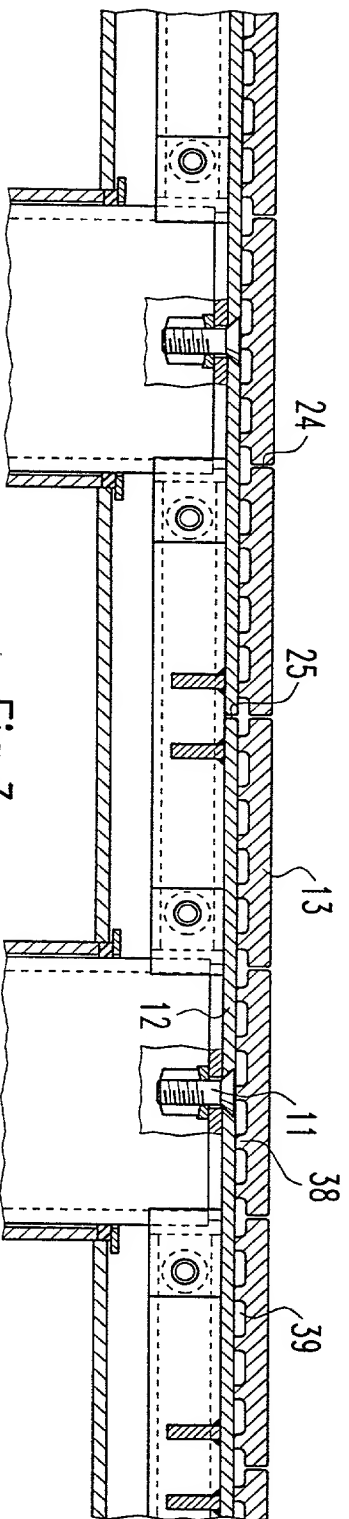
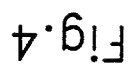


Fig. 3



Express Mail No. EM175422875US

Attorney Docket No. _____

DECLARATION, POWER OF ATTORNEY, AND PETITION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

FIRE GRATE, IN PARTICULAR FOR WASTE INCINERATORS

the specification of which (check one below):

(XX) is attached hereto.

() was filed on _____ as Application Serial No. _____ or Express Mail No. _____, Serial No. not yet known, and was amended on _____ (if applicable).

() was filed on _____ as PCT International Application No. _____, and as amended under PCT Article 19 on _____ (if any).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations §1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s)

Priority Claimed

<u>196 06 107.5</u> (Number)	<u>Germany</u> (Country)	<u>02/19/96</u> Day/Month/Year Filed	(<input checked="" type="checkbox"/>) Yes () No
<u> </u> (Number)	<u> </u> (Country)	<u> </u> Day/Month/Year Filed	() Yes () No
<u> </u> (Number)	<u> </u> (Country)	<u> </u> Day/Month/Year Filed	() Yes () No

I hereby claim the benefit under Title 35, United States Code, §120 and/or §119(e) of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose to the United States Patent and Trademark Office all information known to me to be material to patentability as defined in Title 37, Code of Federal Regulations §1.56, which became available between the filing date of the prior application and the national or PCT international filing date of this application.

<u> </u> (Serial No.)	<u> </u> (Filing Date)	<u> </u> (Status: Patented, Pending, or Abandoned)
<u> </u> (Serial No.)	<u> </u> (Filing Date)	<u> </u> (Status: Patented, Pending, or Abandoned)
<u> </u> (Serial No.)	<u> </u> (Filing Date)	<u> </u> (Status: Patented, Pending, or Abandoned)

I hereby appoint Richard H. Evans (R. No. 19,755), John D. Poffenberger (R. No. 20,245), Bruce Tittel (R. No. 22,324), Donald F. Frei (R. No. 21,190), David J. Josephic (R. No. 22,849), A. Ralph Navaro, Jr. (R. No. 23,050), David S. Stallard (R. No. 25,930), J. Robert Chambers (R. No. 25,448), Gregory J. Lunn (R. No. 29,945), Kurt L. Grossman (R. No. 29,799), Clement H. Luken, Jr. (R. No. 32,742), Thomas J. Burger (R. No. 32,662), Gregory F. Ahrens (R. No. 32,957), Joseph R. Jordan (R. No. 25,686), Wayne L. Jacobs (R. No. 35,553), Kurt A. Summe (R. No. 36,023), C. Richard Eby (R. No. 25,854), Thomas W. Humphrey (R. No. 34,353), Keith R. Haupt (R. No. 37,638), David E. Pritchard (R. No. 38,273), Theodore R. Remaklus (R. No. 38,754), J. Dwight Poffenberger, Jr. (R. No. 35,324), and Stephen W. Barns (R. No. 38,037) my attorneys, with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

Address all correspondence and telephone calls to Thomas J. Burger at Wood, Herron & Evans, P.L.L., 2700 Carew Tower, Cincinnati, Ohio, 45202 at telephone number (513) 241-2324.

Wherefore I pray that Letters Patent be granted to me for the invention or discovery described and claimed in the foregoing specification and claims, and I hereby subscribe my name to the foregoing specification and claims, declaration, power of attorney, and this petition.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor
(given name, family name) Walter Josef Martin

Inventor's signature W Martin Date 8.1.97

City and State of Residence Munich - Germany Citizenship German
Post Office Address Leopoldstr. 248 - D 80807 München

Full name of second joint inventor,
if any (given name, family name) Johannes Martin

Second inventor's signature Johannes Martin Date 7.1.97

City and State of Residence Munich Germany Citizenship German
Post Office Address Im Seidel-Rogen 62, D-81929 Munich

Full name of third joint inventor,
if any (given name, family name) _____

Third inventor's signature _____ Date _____

City and State of Residence _____ Citizenship _____
Post Office Address _____

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY
STATUS (37 CFR 1.9(f) and 1.27(c)) - SMALL BUSINESS CONCERN

Attorney's Docket No. _____

I hereby declare that I am

- ☐ the owner of the small business concern identified below:
☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN Martin GmbH für Umwelt- und Energietechnik
ADDRESS OF CONCERN Leopoldstraße 248, D-80807 München, Germany

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled
FIRE GRATE, IN PARTICULAR FOR WASTE INCINERATORS

by the Inventor(s) _____
described in

- ☒ the specification filed herewith
☐ application Serial No. _____, filed
☐ Patent No. _____, issued

If the rights held by the above-identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9(d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e). *NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities (37 CFR 1.27)

FULL NAME _____

ADDRESS _____

☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate.
(37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING Johannes MARTIN
TITLE OF PERSON SIGNING Managing Director
ADDRESS OF PERSON SIGNING Im-Siedel-Bogen 62, D-81929 Munich
SIGNATURE Johannes Martin DATE 02/04/97